

Rec'd PCT/PTO 13 OCT 2005

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



10/552831



(43) International Publication Date
28 October 2004 (28.10.2004)

PCT

(10) International Publication Number
WO 2004/093313 A3

(51) International Patent Classification⁷:

H03G 3/30

(21) International Application Number:

PCT/IB2004/001073

(22) International Filing Date: 22 March 2004 (22.03.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
03101059.8 17 April 2003 (17.04.2003) EP

(71) Applicant (for all designated States except US): KONINKLIJKE PHILIPS ELECTRONICS N.V. [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).

(72) Inventor; and

(75) Inventor/Applicant (for US only): LAMBRECHT, Xavier, Jean, Francols [BE/DE]; c/o Philips Intellectual Property & Standards GmbH, Weisshausstr. 2, 52066 Aachen (DE).

(74) Agent: VOLMER, Georg; Philips Intellectual Property & Standards GmbH, Weisshausstr. 2, 52066 Aachen (DE).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

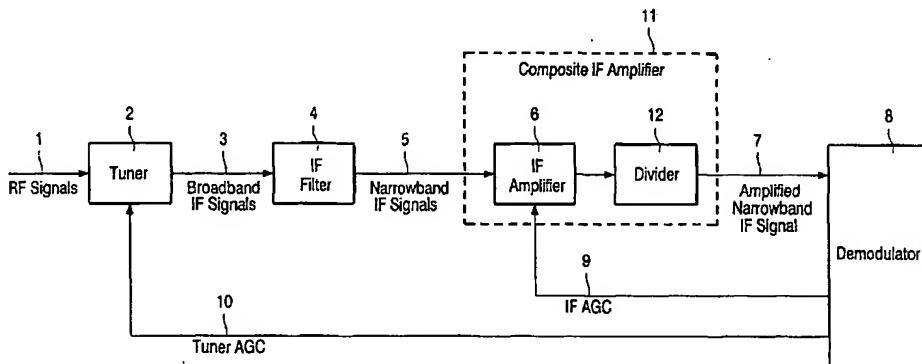
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: FRONT-END SENSITIVITY BOOSTER



WO 2004/093313 A3

(57) Abstract: The invention relates to a method for increasing the sensitivity of a chain of amplifiers that comprises the steps of amplifying a signal by means of a first amplifier with a gain factor $A_1 = A_{1,m} * \Delta A_1$, where $A_{1,m}$ denotes a constant gain factor and ΔA_1 denotes a gain factor variation with $1 \leq \Delta A_{1,min} \leq \Delta A_1 \leq \Delta A_{1,max}$, further amplifying the signal by means of a second amplifier with a controllable gain factor $A_2 \leq A_{2,max}$, where variations ΔA_1 of the gain of the first amplifier are compensated by reducing the gain A_2 of the second amplifier, so that the difference between the chain gain factor $A_C = A_1 * A_2$ and a target chain gain factor $A_T \leq A_{T,max}$ becomes zero. To solve the object of the invention to provide a method for increasing the sensitivity of a chain of amplifiers that suffers from gain factor variations, it is proposed that that the signal at the output of the second amplifier is additionally fed into a divider that applies a fixed factor $A_3 \leq 1$ to its input, that variations ΔA_1 of the gain factor A_1 of the first amplifier as well as the fixed factor A_3 are at least partially compensated by the gain factor A_2 of the second amplifier, so that the difference between the chain gain factor $A_C' = A_1 * A_2 * A_3$ and the target chain gain factor A_T becomes minimum, and that the fixed factor A_3 is chosen so that there exist at least some combinations of values ΔA_1 and A_T for which said difference can be forced to zero, and some combinations of values ΔA_1 and A_T , for which said difference can no longer be forced to zero due to the limitation $A_2 \leq A_{2,max}$. The invention further relates to a device for increasing the sensitivity of a chain of amplifiers.



(88) Date of publication of the international search report:
16 December 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/IB2004/001073

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H03G3/30

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H03G H03F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 838 896 A (NIPPON ELECTRIC CO) 29 April 1998 (1998-04-29) cited in the application abstract column 7, line 32 - column 12, line 44; figure 5 -----	1-10
A	EP 0 797 299 A (NIPPON ELECTRIC CO) 24 September 1997 (1997-09-24) abstract column 4, line 30 - column 5, line 32; figure 1 column 5, line 37 - column 7, line 50; figures 2,3 column 11, line 46 - column 12, line 3; figures 7A,7B -----	1-10
		-/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the International filing date but later than the priority date claimed

- *T* later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *Z* document member of the same patent family

Date of the actual completion of the international search

11 October 2004

Date of mailing of the international search report

20/10/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel: (+31-70) 340-2040, Tx. 31 651 epo nl.
Fax: (+31-70) 340-3016

Authorized officer

Trafidlo, R

INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB2004/001073

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 940 143 A (MIZUKAMI HIROYUKI ET AL) 17 August 1999 (1999-08-17) abstract column 1, line 26 - column 3, line 28; figure 4 -----	1-10
A	US 6 148 189 A (ASCHWANDEN FELIX) 14 November 2000 (2000-11-14) abstract column 2, line 20 - line 43; figure 1 column 3, line 31 - column 4, line 7 -----	1-10
A	US 4 434 405 A (GANS MICHAEL J ET AL) 28 February 1984 (1984-02-28) abstract column 1, line 47 - column 2, line 2 column 3, line 65 - column 4, line 7; figure 3 -----	1-10
A	GB 2 334 162 A (MOTOROLA LTD) 11 August 1999 (1999-08-11) page 3, line 6 - line 8 page 4, line 27 - page 5, line 25; figure 1 page 7, line 16 - page 8, line 9; figure 4 -----	1-10

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB2004/001073

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
EP 0838896	A	29-04-1998	JP	2993558 B2		20-12-1999
			JP	10126301 A		15-05-1998
			AU	738168 B2		13-09-2001
			AU	4276997 A		30-04-1998
			EP	0838896 A2		29-04-1998
			US	6032031 A		29-02-2000
EP 0797299	A	24-09-1997	JP	2996170 B2		27-12-1999
			JP	9260982 A		03-10-1997
			AU	727017 B2		30-11-2000
			AU	1643197 A		25-09-1997
			CA	2200530 A1		21-09-1997
			EP	0797299 A2		24-09-1997
			US	6075978 A		13-06-2000
US 5940143	A	17-08-1999	JP	9163265 A		20-06-1997
US 6148189	A	14-11-2000	AU	5344296 A		18-11-1996
			AU	5344396 A		18-11-1996
			CN	1183181 A ,B		27-05-1998
			DE	69629678 D1		02-10-2003
			DE	69629678 T2		29-07-2004
			EP	0823145 A1		11-02-1998
			EP	0829133 A1		18-03-1998
			WO	9634453 A1		31-10-1996
			WO	9634452 A1		31-10-1996
			JP	11504182 T		06-04-1999
			JP	11504183 T		06-04-1999
US 4434405	A	28-02-1984	CA	1189920 A1		02-07-1985
			GB	2119192 A		09-11-1983
GB 2334162	A	11-08-1999	NONE			